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TITLE: IMAGE SYNTHESIZER

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ABSTRACT:

PURPOSE: To satisfy privacy protection and to easily observe a monitoring picture without interrupting it by synthetically displaying a picked up image and a prescribed image in a specific visual field area relating to privacy protection or the like.

CONSTITUTION: A camera 1 is fixed on a high position and horizontally rotated by a turntable device 2 so as to rotationally monitor pictures in the fixed state of periphery tilt angle and zooming rate. In the case of camera monitoring, a specific visual field area such as a resident section is

previously registered in a memory controller 5 as the range of two horizontal
and vertical directions and utilized as data for privacy protection. Then
masking processing based upon the privacy protection data is applied to the
picture of the resident section photographed by the camera 1 based upon a video
signal outputted from a video output device 6.

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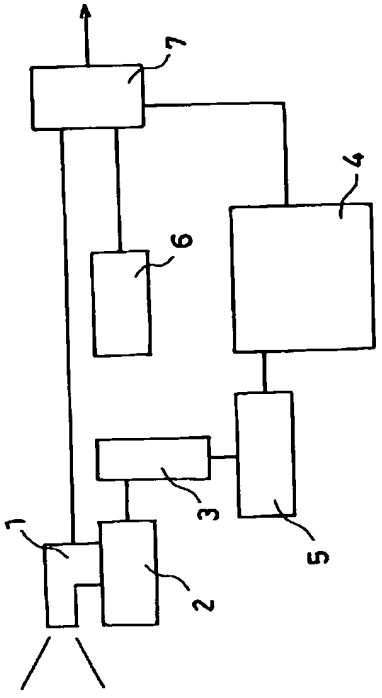
(54)【発明の名称】　画像合成装置

(57)【要約】　（修正有）

【目的】　監視機能を損なわずにプライバシー保護をなし得る監視映像を合成できる画像合成装置を提供する。

【構成】　撮像する特定視野領域を垂直方向及び水平方向範囲として記憶する第１の記憶手段と、撮像視野を垂直方向及び水平方向に分割処理する手段と、垂直及び水平方向に複数に分割された各撮像視野が、記憶した特定視野領域の垂直及び水平方向範囲と重合するか否かをそれぞれ判定する第１及び第２の判定手段と、第１の判定手段の判定結果を記憶する第２の記憶手段と、第１及び第２の判定手段の判定結果に従い、撮像視野における特定視野領域の重合状態を決定する手段と、その決定された重合状態を記憶する第３の記憶手段と、その記憶内容に従い、撮像視野内における特定視野領域の重合する部分が所定の画像で表示されるように、非重合部分には撮像した画像がそのまま表示されるように制御する画像表示制御手段とを備えた。



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【特許請求の範囲】

【請求項１】　撮像する特定視野領域を垂直方向及び水平方向範囲として記憶する第１の記憶手段と、

撮像視野を垂直方向及び水平方向に複数に分割する分割処理手段と、

垂直方向に複数に分割された各撮像視野が、記憶した前記特定視野領域の垂直方向範囲と重合するか否かを判定する第１の判定手段と、

前記第１の判定手段の判定結果を記憶する第２の記憶手段と、

水平方向に複数に分割された各撮像視野が、記憶した前記特定視野領域の水平方向範囲と重合するか否かを判定する第２の判定手段と、

前記第１及び第２の判定手段の判定結果に従い、撮像視野における前記特定視野領域の重合状態を決定する重合状態決定手段と、

前記重合状態決定手段が決定した重合状態を記憶する第３の記憶手段と、

前記第３の記憶手段が記憶した内容に従い、撮像視野内における前記特定視野領域の重合する部分に対しては所定の画像が表示されるように、重合しない部分に対しては撮像した画像がそのまま表示されるように制御する画像表示制御手段とを備えたことを特徴とする画像合成装置。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は、撮像装置の方位及び視野角を元に、特定の視野角に該当する映像のみを他映像でマスク処理する機能を有する画像合成装置に関するものである。

【０００２】

【従来の技術】近年、防災上、或いは災害発生時の緊急活動を支援するためにカメラを用いた監視システムの活用が注目されている。ここで、災害現場をカメラで監視する場合には、通常、高倍率で高解像の映像が要求されるが、特に市街地を監視する場合には、その範囲によっては相当高性能な監視装置を用いることも必要となる。例えば、消防署において使用されるカメラを使用した「火の見櫓のシステム」では、倍率が５０倍以上の高性能ＴＶカメラレンズと、水平８００画素のＣＣＤを用いた撮像装置等を使用することによって極めて鮮明で高倍率な映像を得ることができるようになっている。

【０００３】ところが、そのような高性能な監視装置を用いて市街地を監視する場合には、居住区を常に高倍率で監視することになるため、プライバシー保護の面で問題が生じる。そこで、従来は、緊急時以外の通常の監視時においては、居住区が映し出されないようにカメラ回転に機械的な制限機能を設けていた。例えば、居住区アングルに対しては、水平旋回するカメラのレンズ位置を上方向に転向させ、映像を回避するようになっている。

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【０００４】

【発明が解決しようとする課題】しかしながら、上記のような映像回避方法をとる場合には、通常のカメラ旋回監視時に、居住区を避けるような矩形的なカメラ動作となってしまい、居住区のプライバシー保護をなし得る反面、スムーズな映像の流れが得られないという監視上の問題があった。即ち、得られる監視映像は、途切れ途切れとなって大変見づらいものとなるし、また、仮に映像回避した居住区に異常事態が発生した場合には、全くその発見ができないという重大な問題を引き起こしてしまう。

【０００５】本発明は、かかる現状に鑑みてなされたものであり、監視機能を損なわずにプライバシー保護をなし得る監視映像を合成することが可能な画像合成装置を提供することを目的としている。

【０００６】

【課題を解決するための手段】上記目的を達成するために、本発明にかかる画像合成装置は、撮像する特定視野領域を垂直方向及び水平方向範囲として記憶する第１の記憶手段と、撮像視野を垂直方向及び水平方向に複数に分割する分割処理手段と、垂直方向に複数に分割された各撮像視野が、記憶した前記特定視野領域の垂直方向範囲と重合するか否かを判定する第１の判定手段と、前記第１の判定手段の判定結果を記憶する第２の記憶手段と、水平方向に複数に分割された各撮像視野が、記憶した前記特定視野領域の水平方向範囲と重合するか否かを判定する第２の判定手段と、前記第１及び第２の判定手段の判定結果に従い、撮像視野における前記特定視野領域の重合状態を決定する重合状態決定手段と、前記重合状態決定手段が決定した重合状態を記憶する第３の記憶手段と、前記第３の記憶手段が記憶した内容に従い、撮像視野内における前記特定視野領域の重合する部分に対しては所定の画像が表示されるように、重合しない部分に対しては撮像した画像がそのまま表示されるように制御する画像表示制御手段とを備えたことを特徴としている。

【０００７】

【作用】上記構成によれば、第１の記憶手段により、撮像すべき特定視野領域が垂直方向及び水平方向の範囲として記憶される。また、分割処理手段により、撮像視野が垂直方向及び水平方向に複数に分割されて処理される。

【０００８】次に、分割処理手段によって垂直方向に分割された各撮像視野と、分割記憶された特定視野領域の垂直方向範囲とが重合するか否かが、第１の判定手段により判定される。また、この判定結果は、第２の記憶手段により記憶される。続いて、分割処理手段によって水平方向に分割された各撮像視野と、分割記憶された特定視野領域の水平方向範囲とが重合するか否かが、第２の判定手段によって判定される。そこで、第１及び第２の

判定手段の判定結果に従い、撮像視野における特定視野領域の重合状態が重合状態決定手段により決定される。また、決定された重合状態については、第3の記憶手段により記憶される。

【0009】更に、記憶した重合状態に従い、重合する部分については所定の画像が表示されるように、また重合しない部分については、撮像した画像がそのまま表示されるように、画像表示制御手段によって制御される。以上の結果、撮像視野に特定視野領域が重合した場合には、その重合部分に対して所定の画像が表示されるため、表示画像としては、撮像画像と所定の画像とが合成されたものとなる。

【0010】

【実施例】以下、本発明の一実施例について、図面を参照しながら具体的に説明する。図1は本発明にかかる画像合成装置の構成を示すブロックである。この画像合成装置は、カメラ1と、カメラ1を支持し回転させる回転台装置2と、カメラ1の方位と視野角を検知する状態検出器3と、8行12列配列のメモリー4と、状態検出器3からの検出信号を受けてメモリー4にデータを書き込み、また書き込んだデータを読み出すメモリーコントローラ5と、カメラ1からの映像信号と同期のとれた映像信号を出力する映像出力装置6と、メモリー4からの出力データを受け、カメラ1からの映像信号と映像出力装置6からの映像信号とを切り換える映像切換器7とから構成されている。

【0011】例えば、この画像合成装置を消防署で使用する場合には、上記カメラ1は火の見櫓の目として高所に取付けられ、回転台装置2によって水平旋回され、周辺の状況をチルト角、ズーム率固定でもって旋回監視する。このカメラ監視を行うにあたっては、居住区等の特定視野領域を、水平方向と垂直方向の2方向の範囲としてメモリーコントローラ5に予め登録して、プライバシー保護のためのデータとして利用されるようになっている。そして、映像出力装置6から出力される映像信号により、カメラ1が映し出した居住区部分の映像に対して、プライバシー保護データに従ったマスクキング処理が行われるようになっている。

【0012】図2～図4は、図1に示す画像合成装置の動作処理を示すフローチャートである。図2に示すように、先ず第1過程として、カメラ1の旋回監視を行う前に、居住区等のプライバシー保護に係わる特定視野範囲

をK組のプライバシー保護データとして、その水平範囲（Dhs(k)～Dhe(k)）、垂直範囲（Dvs(k)～Dve(k)）という形でメモリーコントローラ5に入力する（S1）。ここで、Dhs(k)、Dhe(k)、Dvs(k)、Dve(k)は、K組のプライバシー保護データの内のk番目に当たるプライバシー保護データを示している。即ち、Dhs(k)はカメラ1の水平方向における撮像開始角度を、Dhe(k)はカメラ1の水平方向における撮像終了角度を、Dvs(k)はカメラ1の垂直方向における撮像開始角度を、Dve(k)はカメラ1の垂直方向における撮像終了角度を示している。なお、角度については、この明細書中において、全てカメラ1のレンズ面からの立体角として表現している。

【0013】続いて、メモリーコントローラ5では、入力されたK組のプライバシー保護データを元に、次の4つの計算式〔数1〕により、k番目のプライバシー保護範囲の水平方向中心値 DH(k)と、垂直方向中心値 DV(k)と、水平方向範囲幅の1／2の値 WH(k)と、垂直方向範囲幅の1／2の値 WV(k)（但し、kは1以上K以下の自然数とする）を計算し、保存する（S2）。

【0014】

【数1】

$$DH(k) = (Dhs(k) + Dhe(k)) / 2$$

$$DV(k) = (Dvs(k) + Dve(k)) / 2$$

$$WH(k) = |Dhs(k) - Dhe(k)| / 2$$

$$WV(k) = |Dvs(k) - Dve(k)| / 2$$

【0015】第2過程では、メモリーコントローラ5で、カメラ1の垂直視野角範囲を Tvs～Tve （但し、0＜Tvs ＜Tve ）として8分割し、8分割した各々の範囲における垂直方向中心値V(i)と垂直方向範囲幅の1／2の値VW(i) （但しiは1以上8以下の自然数とする）を次の関係式〔数2〕を用いて求める（S3）。

【0016】

【数2】

$$V(i) = (V_o(i+1) + V_o(i)) / 2$$

$$VW(i) = (V_o(i+1) - V_o(i)) / 2$$

【0017】また別途、〔数2〕の計算に必要となる V。(i)を次式〔数3〕を用いて求めておく。

【0018】

【数3】

5　　6

$$V_o(5) = (Tve + Tvs) / 2$$

$$V_o(1) = V_o(5) - \arctan(\tan(Tve - Tvs) / 2))$$

$$V_o(2) = V_o(5) - \arctan((3/4)\tan((Tve - Tvs) / 2))$$

$$V_o(3) = V_o(5) - \arctan((1/2)\tan((Tve - Tvs) / 2))$$

$$V_o(4) = V_o(5) - \arctan((1/4)\tan((Tve - Tvs) / 2))$$

$$V_o(6) = V_o(5) + \arctan((1/4)\tan((Tve - Tvs) / 2))$$

$$V_o(7) = V_o(5) + \arctan((1/2)\tan((Tve - Tvs) / 2))$$

$$V_o(8) = V_o(5) + \arctan((3/4)\tan((Tve - Tvs) / 2))$$

$$V_o(9) = V_o(5) + \arctan(\tan((Tve - Tvs) / 2))$$

【００１９】ここでＶ。(i)は、カメラ１の視野角範囲Tvs～Tve を８分割したｉ番目の値を、またarctanは逆正接を示している。次に、第３過程では、上記〔数１〕及び〔数２〕で求めたDV(k) 、WV(k) 、V(i)、VW(i) の各値から、次式〔数４〕が成立するか否かを判定する（Ｓ４）。

【００２０】

【数４】

$$| V(i) - DV(k) | < VW(i) + WV(k)$$

【００２１】即ち、この式は、カメラ１の垂直方向視野角範囲を８分割した各範囲が、先に保存した垂直方向についてのプライバシー保護範囲と部分的に重合するか否かを判定するものである。そこで、上式〔数４〕が成立する場合（Ｓ４においてＹｅｓの場合）には１、〔数４〕が成立しない場合（Ｓ４においてＮｏの場合）には０とする要素を有する８行Ｋ列の行列Ｒ（ｉ，ｋ）を作成し（Ｓ５及びＳ６）、メモリーコントローラ５に保存しておく。その結果、Ｋ個の垂直方向に関するマスクデータができたことになる。

＊【００２２】第４過程からは実際のカメラ旋回中の方位データをリアルタイムに処理し、プライバシー保護範囲に該当する映像のみに他映像をマスキング処理する過程に入る。即ち、図３に示すようにメモリーコントローラ５では、カメラ１の水平視野角範囲を Hvs～Hve （但し、０<Hvs <Hve ）として１２分割し、１２分割した各々の範囲における水平方向中心値H(i)と水平方向範囲幅の１／２の値HW(i) （但し、ｉは１以上１２以下の自然数とする）とを求める次式〔数５〕を準備しておく（Ｓ７）。

【００２３】

【数５】

$$H(i) = (H_o(i + 1) + H_o(i)) / 2$$

$$HW(i) = (H_o(i + 1) - H_o(i)) / 2$$

【００２４】また別途、〔数５〕の計算に必要となる H。(i) を次式〔数６〕を用いて求めておく。

【００２５】

【数６】

7　　8

$$H_o(7) = (Hve + Hvs)/2$$

$$H_o(1) = H_o(7) - \arctan(\tan((Hve - Hvs)/2))$$

$$H_o(2) = H_o(7) - \arctan((5/6)\tan((Hve - Hvs)/2))$$

$$H_o(3) = H_o(7) - \arctan((2/3)\tan((Hve - Hvs)/2))$$

$$H_o(4) = H_o(7) - \arctan((1/2)\tan((Hve - Hvs)/2))$$

$$H_o(5) = H_o(7) - \arctan((1/3)\tan((Hve - Hvs)/2))$$

$$H_o(6) = H_o(7) - \arctan((1/6)\tan((Hve - Hvs)/2))$$

$$H_o(8) = H_o(7) + \arctan((1/6)\tan((Hve - Hvs)/2))$$

$$H_o(9) = H_o(7) + \arctan((1/3)\tan((Hve - Hvs)/2))$$

$$H_o(10) = H_o(7) + \arctan((1/2)\tan((Hve - Hvs)/2))$$

$$H_o(11) = H_o(7) + \arctan((2/3)\tan((Hve - Hvs)/2))$$

$$H_o(12) = H_o(7) + \arctan((5/6)\tan((Hve - Hvs)/2))$$

$$H_o(13) = H_o(7) + \arctan(\tan((Hve - Hvs)/2))$$

【００２６】ここで $H_o(i)$ は、カメラ１の水平視野角範囲 Hvs～Hve を１２分割したｉ番目の値を、またarctanは逆正接を示している。また、上記〔数６〕の式を用いて、〔数５〕のH(i)とHW(i) を求めることになるが、実際には、カメラ１はズーム率を固定しており、リアルタイムでその視野中心の方位データ（即ち、 $H_o(7)$の値となる）のみを状態検出器３で検出するのでH(i)は $H_o(7)$ の一次関数となり、HW(i) は明らかに固定値となる。

【００２７】第５過程では、メモリーコントローラ５は、カメラ１の水平旋回動作に伴い、状態検出器３からカメラ視野中心の方位データ $H_o(7)$ をリアルタイムに逐次受信し、上記〔数５〕により、カメラ水平方向視野中心値H(i)を算出する（Ｓ８）。続いて、メモリーコントローラ５では、カメラ水平方向範囲幅の１／２の値であるHW(i) が既知であることから、前記H(i)及びHW(i) におけるｉを１から１２まで、前記DH(k) 及びWH(k) におけるｋを１からＫまで高速で変化させ次式〔数７〕の判定を行う（Ｓ９～Ｓ１７）。

【００２８】

【数７】

$$|H(i) - DH(k)| < HW(i) + WH(k)$$

【００２９】即ち、この式は、カメラ１の水平方向視野角範囲を１２分割した各範囲が、先に保存した水平方向についてのプライバシー保護範囲と部分的に重合するか否かを判定するものである。そこで上式〔数７〕が成立する場合（Ｓ１０においてＹｅｓの場合）には、先に保存した行列Ｒ（ｉ，ｋ）のｋ列データを８行１２列メモ＊リー４のｉ列に加算書込みを行い（Ｓ１１）、〔数７〕が成立しない場合（Ｓ１０においてＮｏの場合）には、メモリー４のｉ列に０を書き込む（Ｓ１２）。この結果、先に保存したＫ個の垂直方向に関するマスクデータが、リアルタイムで得られる水平方向に関するマスクデータに従ってメモリー４に書き込まれることとなり、カメラ１の視野に対するマスクデータが逐次作成される。

【００３０】次に、図４に示すように、メモリー４に書き込まれたマスクデータについては、カメラ１の水平旋回に対応して、常時、メモリー４からのデータ読み出しが行われる（Ｓ１８）。更に、メモリー４からの読み出しデータを出力信号として、出力信号が０ならばカメラ１からの映像信号をそのまま出力し（Ｓ２０）、出力信号が１ならば映像出力装置６からの外部映像信号を出力する（Ｓ２１）。ここで、これらの映像信号の切り換えについては、映像切換器７によって行われる。なお、Ｓ２０及びＳ２１の処理の後は、Ｓ８の処理に戻ることになる。

【００３１】このように、プライバシー保護に係る特定視野範囲が、旋回するカメラ１の水平視野角範囲に入ると、予め作成しておいたプライバシー保護情報であるマスクデータがカメラ１の水平旋回動作のタイミングでもって逐次メモリ４に書き込まれ、更にこのデータがメモリ４から逐次読み出される。そして、読み出されたデータに従い、映像画面の垂直方向の１／８画面及び水平方向の１／１２画面を最小単位として、映像出力装置６から出力された他映像により、マスキングされた画像が合成される。

【００３２】本実施例の画像合成装置によれば、カメラ

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1を水平旋回中にカメラ1の水平方向視野中心データ H。(i) のみをリアルタイムに取り込み、上記〔数7〕に示す単純な判定式を利用してメモリー4に8ビットのデータを書き込むだけで、映像画面の垂直方向の画角幅の1／8、水平方向の画角幅の1／12を最小単位として、プライバシー保護として登録された視野範囲のみを外部映像（例えばモザイク映像）でマスキングした画像をカメラ水平旋回動作中に合成することができるようになる。そして、本実施例における画像合成処理は高速処理が可能であって、カメラ1の旋回速度を大きくした場合でもマスキングの追従性には全く影響を及ぼすものではない。

【0033】なお、本実施例では、カメラの水平旋回動作に対してのマスキング処理について説明したが、垂直方向にカメラを回転動作させる場合のマスキング処理についても、同様な処理を行うことが可能である。また、カメラの垂直方向の回転動作に対応できるし、垂直回転動作と水平回転動作を組み合わせて監視を行う場合についても、同様にしてプライバシー情報は保護される。更に、マスキングの最小単位を映像画面の垂直方向の画角幅の1／8、水平方向の画角幅の1／12として説明したが、勿論これに限定されるものではなく、更に細かく、或いは逆に大きくすることもまた可能である。

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【0034】

【発明の効果】本発明にかかる画像合成装置を撮像監視装置に利用する場合には、プライバシー保護等にかかる特定視野領域については撮像画像と所定の画像とが合成されて表示されるため、プライバシー保護機能を十分に満足する。また、監視画像は途切れることがなく、スムースに流れるようになり、大変見易くなる。

【図面の簡単な説明】

【図1】本発明にかかる画像合成装置の構成を示すブロック図である。

【図2】図1に示す画像合成装置の動作処理を示すフローチャートである。

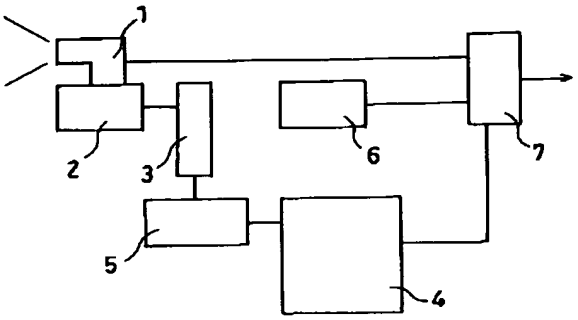
【図3】図2に示すフローチャートの続きである。

【図4】図3に示すフローチャートの続きである。

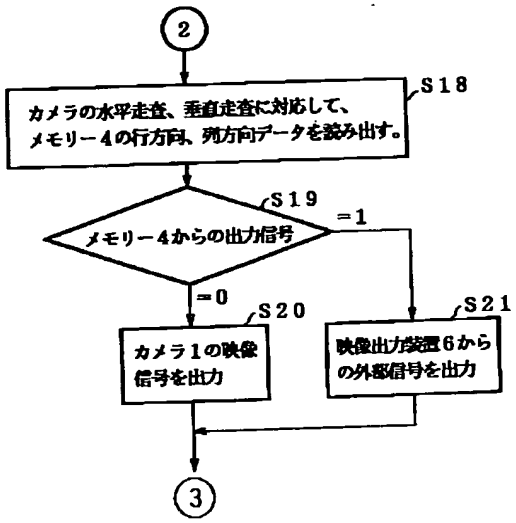
【符号の説明】

1　カメラ
2　回転台装置
3　状態検出器
4　メモリー
5　メモリーコントローラ
6　映像出力装置
7　映像切換器

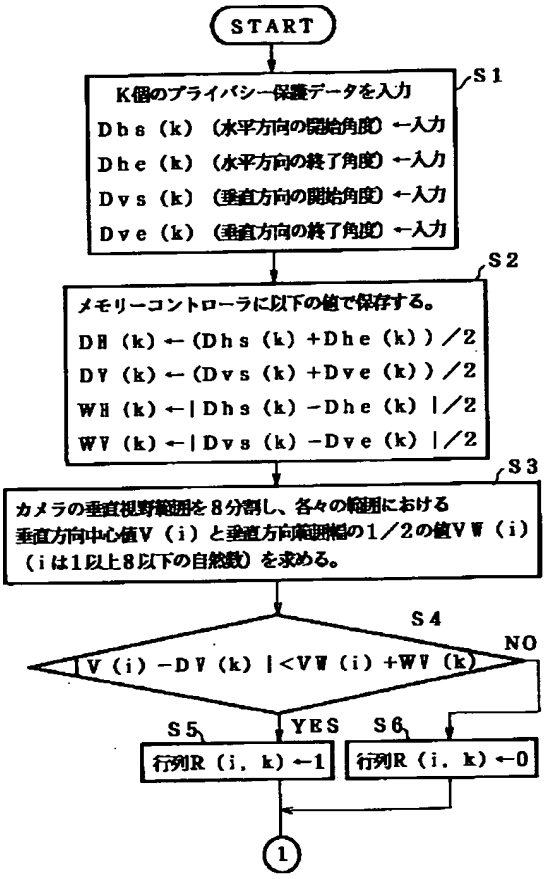
【図1】



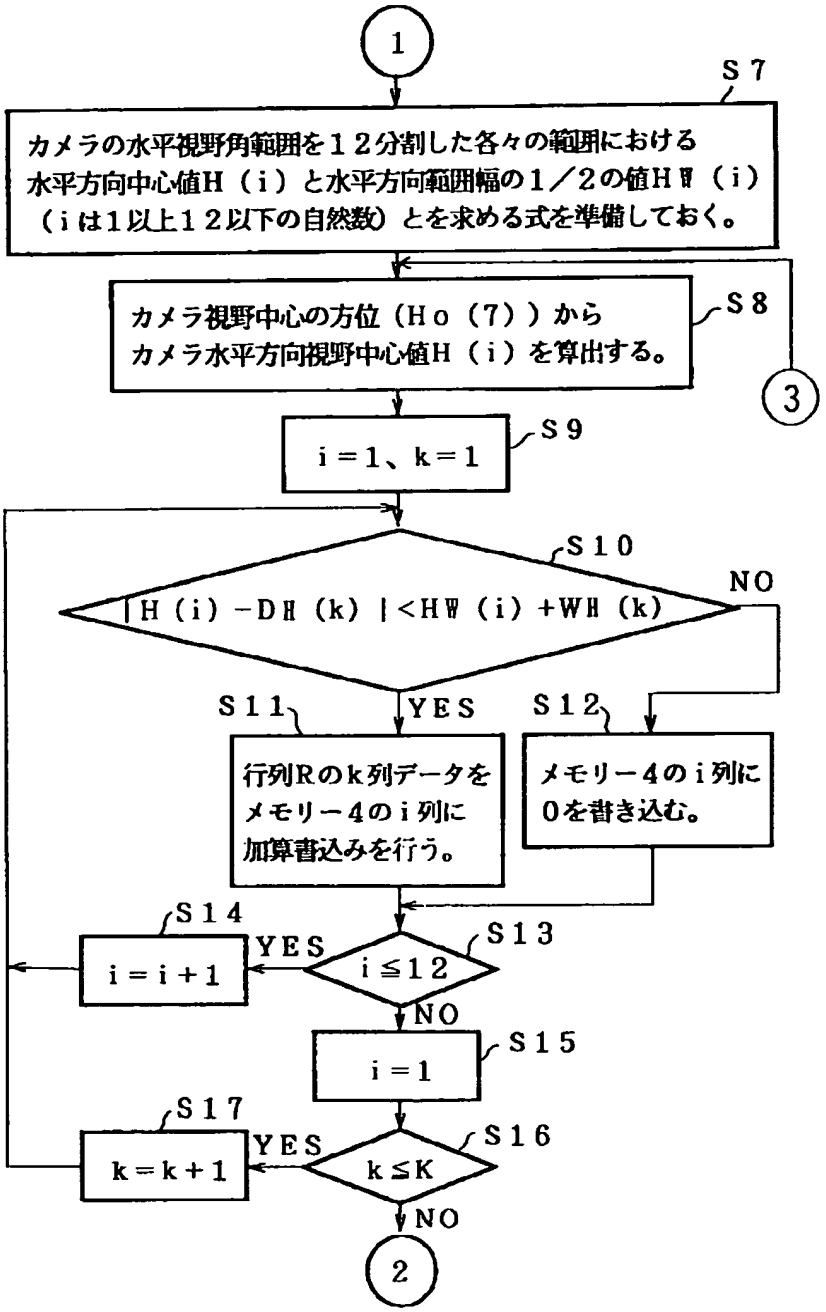
【図4】



【図2】


START
K個のプライバシー保護データを入力
Dhs (k) (水平方向の開始角度) ←入力
Dhe (k) (水平方向の終了角度) ←入力
Dvs (k) (垂直方向の開始角度) ←入力
Dve (k) (垂直方向の終了角度) ←入力
S1
メモリーコントローラに以下の値で保存する。
DH (k) ← (Dhs (k) +Dhe (k)) ／2
DV (k) ← (Dvs (k) +Dve (k)) ／2
WH (k) ← | Dhs (k) −Dhe (k) | ／2
WV (k) ← | Dvs (k) −Dve (k) | ／2
S2
カメラの垂直視野範囲を8分割し、各々の範囲における
垂直方向中心値V (i) と垂直方向範囲幅の1／2の値VW (i)
(iは1以上8以下の自然数) を求める。
S3
S4
| V (i) −DV (k) | <VW (i) +WV (k)
NO
YES
S5
行列R (i, k) ←1
S6
行列R (i, k) ←0
1

【図3】


1
S7
カメラの水平視野角範囲を１２分割した各々の範囲における
水平方向中心値H（i）と水平方向範囲幅の１／２の値HW（i）
（iは1以上１２以下の自然数）とを求める式を準備しておく。
カメラ視野中心の方位（Ho（7））から
カメラ水平方向視野中心値H（i）を算出する。
S8
3
i＝1、k＝1
S9
S10
|H（i）－DH（k）|<HW（i）+WH（k）
NO
YES
S11
行列Rのk列データを
メモリー4のi列に
加算書込みを行う。
S12
メモリー4のi列に
0を書き込む。
S14
i＝i＋1
YES
S13
i≦12
NO
S15
i＝1
S17
k＝k＋1
YES
S16
k≦K
NO
2

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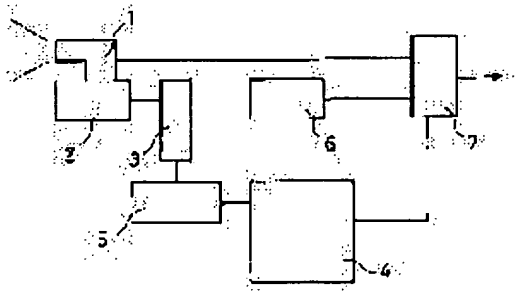
HATTORI NAOMI

(54) IMAGE SYNTHESIZER

(57)Abstract:

PURPOSE: To satisfy privacy protection and to easily observe a monitoring picture without interrupting it by synthetically displaying a picked up image and a prescribed image in a specific visual field area relating to privacy protection or the like.

CONSTITUTION: A camera 1 is fixed on a high position and horizontally rotated by a turntable device 2 so as to rotationally monitor pictures in the fixed state of periphery tilt angle and zooming rate. In the case of camera monitoring, a specific visual field area such as a resident section is previously registered in a memory controller 5 as the range of two horizontal and vertical directions and utilized as data for privacy protection. Then masking processing based upon the privacy protection data is applied to the picture of the resident section photographed by the camera 1 based upon a video signal outputted from a video output device 6.



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* NOTICES *

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CLAIMS

[Claim(s)]
[Claim 1] The 1st storage means which memorizes the specific visual field field to picturize as a perpendicular direction and horizontal range, A field of view A perpendicular direction and a division processing means to divide into plurality horizontally, The 1st judgment means which judges whether each field of view divided perpendicularly at plurality carries out a polymerization to the perpendicular direction range of said memorized specific visual field field, The 2nd judgment means which judges whether each field of view horizontally divided into plurality carries out a polymerization to the horizontal range of said memorized specific visual field field to be the 2nd storage means which memorizes the judgment result of said 1st judgment means, A polymerization condition decision means to determine the polymerization condition of said specific visual field field in a field of view according to the judgment result of said 1st and 2nd judgment means, So that the contents which the 3rd storage means which memorizes the polymerization condition which said polymerization condition decision means determined, and said 3rd storage means memorized may be followed and a predetermined image may be displayed to the part which carries out a polymerization in said specific visual field field in a field of view The image synthesizer unit characterized by having the image display control means controlled so that the image picturized to the part which does not carry out a polymerization is displayed as it is.

[Translation done.]

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TECHNICAL FIELD

[Industrial Application] This invention relates to the image synthesizer unit which has the function which carries out mask processing only of the image applicable to a specific angle of visibility with other images based on bearing and the angle of visibility of image pick-up equipment.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the image synthesizer unit which has the function which carries out mask processing only of the image applicable to a specific angle of visibility with other images based on bearing and the angle of visibility of image pick-up equipment.
[0002]
[Description of the Prior Art] In order to support the urgent activity at the time of disaster generating on disaster prevention in recent years, the activity of monitoring system which used the camera attracts attention. Here, when supervising a disaster site with a camera, the image of high resolving is usually required for a high scale factor, but in supervising especially a city area, it is also necessary to use considerable highly efficient supervisory equipment depending on the range. for example, a scale factor is level on the high performance TV camera lens of 50 times or more in "the system of a fire tower" which used the camera used at a fire department -- using the image pick-up equipment using 800-pixel CCD etc. -- very -- clear -- high -- a scale factor image can be acquired now.
[0003] However, since a living quarter will always be supervised for a high scale factor when supervising a city area using such highly efficient supervisory equipment, a problem arises in respect of privacy protection. Then, the mechanical limit function was prepared in camera rotation so that a living quarter might not project conventionally at the time of the usual monitor of those other than emergency. For example, to a living quarter angle type, the lens location of the camera which carries out a level turn is converted upward, and an image is avoided.
[0004]
[Problem(s) to be Solved by the Invention] However, when the above image evasion approaches were taken, while it becomes the rectangle camera actuation which avoids a living quarter and privacy protection of a living quarter could be made at the time of the usual camera revolution monitor, there was a problem on the monitor that the flow of a smooth image is not acquired. That is, the monitor image acquired will cause the serious problem that the discovery cannot be performed at all, when the abnormality situation occurs in the living quarter which became what breaks off, serves as a way piece and it is very much hard to see, and carried out image evasion temporarily.
[0005] This invention aims at offering the image synthesizer unit which can compound the monitor image which is made in view of this present condition, and can make privacy protection, without spoiling a monitoring function.
[0006]
[Means for Solving the Problem] In order to attain the above-mentioned purpose, the image synthesizer unit concerning this invention The 1st storage means which memorizes the specific visual field field to picturize as a perpendicular direction and horizontal range, A field of view A perpendicular direction and a division processing means to divide into plurality horizontally, The 1st judgment means which judges whether each field of view divided perpendicularly at plurality carries out a polymerization to the perpendicular direction range of said memorized specific visual field field, The 2nd judgment means which judges whether each field of view horizontally divided into plurality carries out a polymerization to the horizontal range of said memorized specific visual field field to be the 2nd storage means which memorizes the judgment result of said 1st judgment means, A polymerization condition decision means to determine the polymerization condition of said specific visual field field in a field of view according to the judgment result of said 1st and 2nd judgment means, So that the contents which the 3rd storage means which memorizes the polymerization condition which said polymerization condition decision means determined, and said 3rd storage means memorized may be followed and a predetermined image may be displayed to the part which carries out a polymerization in said specific visual field field in a field of view It is characterized by having the image display control means controlled so that the image picturized to the part which

does not carry out a polymerization is displayed as it is.
[0007]
[Function] According to the above-mentioned configuration, the specific visual field field which should be picturized is memorized as a perpendicular direction and horizontal range by the 1st storage means. Moreover, a field of view is divided and processed by plurality to a perpendicular direction and a horizontal direction with a division processing means.
[0008] Next, it is judged by the 1st judgment means whether each field of view perpendicularly divided by the division processing means and the perpendicular direction range of the specific visual field field by which division storage was carried out carry out a polymerization. Moreover, this judgment result is memorized by the 2nd storage means. Then, it is judged by the 2nd judgment means whether each field of view horizontally divided by the division processing means and the horizontal range of the specific visual field field by which division storage was carried out carry out a polymerization. Then, according to the judgment result of the 1st and 2nd judgment means, the polymerization condition of the specific visual field field in a field of view is determined by the polymerization condition decision means. Moreover, about the determined polymerization condition, it memorizes with the 3rd storage means.
[0009] Furthermore, about the part which does not carry out a polymerization, it is controlled by the image display control means so that the picturized image is displayed as it is, so that a predetermined image is displayed about the part which carries out a polymerization according to the memorized polymerization condition. Since a predetermined image was displayed to the polymerization part when a specific visual field field carries out a polymerization to a field of view the above result, as a display image, the image pick-up image and the predetermined image were compounded.
[0010]
[Example] Hereafter, one example of this invention is explained concretely, referring to a drawing. Drawing 1 is a block which shows the configuration of the image synthesizer unit concerning this invention. The rotation base equipment 2 which this image synthesizer unit supports a camera 1 and a camera 1, and is rotated, The condition detector 3 which detects bearing and the angle of visibility of a camera 1, and the memory 4 of an eight-line 12 train array, The memory controller 5 which reads the data which wrote in and wrote data in memory 4 in response to the detecting signal from the condition detector 3, It consists of image change-over machines 7 which switch the video signal from a camera 1, and the video signal from the image output unit 6 in response to the image output unit 6 which outputs the video signal from a camera 1, and the video signal which was able to take the synchronization, and the output data from memory 4.
[0011] For example, in using this image synthesizer unit at a fire department, the above-mentioned camera 1 is attached in a height as an eye of a fire tower, and with rotation base equipment 2, the level turn of it is carried out and it carries out a revolution monitor to a tilt angle and the rate immobilization of a zoom being about a surrounding situation. In performing this camera monitor, specific visual field fields, such as a living quarter, are beforehand registered into a memory controller 5 as range of the 2-way of a horizontal direction and a perpendicular direction, and it is used as data for privacy protection. And mask king processing in which the privacy protected data was followed to the image of the living quarter part which the camera 1 projected with the video signal outputted from the image output unit 6 is performed.
[0012] Drawing 2 - drawing 4 are flow charts which show processing of the image synthesizer unit shown in drawing 1 of operation. the specific visual field range concerning [as shown in drawing 2 , before performing the revolution monitor of a camera 1 as the 1st process first] privacy protection of a living quarter etc. -- as K sets of privacy protected data -- the level range (Dhs(k) -Dhe(k)) Perpendicular range (Dvs(k) -Dve(k)) ** -- it inputs into a memory controller 5 in the form to say (S1). Here, Dhs (k), Dhe (k), Dvs (k), and Dve (k) show the privacy protected data which hits the k-th of K sets of privacy protected data. That is, Dhs (k) shows the image pick-up termination include angle [in / for an image pick-up initiation include angle / in / for an image pick-up termination include angle / in / for the image pick-up initiation include angle in the horizontal direction of a camera 1 / in Dhe (k) / the horizontal direction of a camera 1 / in Dvs (k) / the perpendicular direction of a camera 1 / in Dve (k) / the perpendicular direction of a camera 1]. In addition, about the include angle, all are expressed as a solid angle from the lens side of a camera 1 in this specification.
[0013] In a memory controller 5, based on K sets of inputted privacy protected data, then, by the following four formulas [several 1] Horizontal central value of the k-th privacy protection range DH (k) and perpendicular direction central value DV (k) and one half of values of horizontal range width of face WH (k) and one half of

values of perpendicular direction range width of face WV (k) (however, k is taken as the natural number below or more 1K) is calculated and saved (S2).

[0014]

[Equation 1]

$$DH(k) = (Dhs(k) + Dhe(k)) / 2$$

$$DV(k) = (Dvs(k) + Dve(k)) / 2$$

$$WH(k) = | Dhs(k) - Dhe(k) | / 2$$

$$WV(k) = | Dvs(k) - Dve(k) | / 2$$

[0015] In the 2nd process, it is the perpendicular angle-of-visibility range of a camera 1 at a memory controller 5. One half of values VW of perpendicular direction central value V (i) and perpendicular direction range width of face in each range which divided eight as Tvs-Tve (however, 0<Tvs <Tve), and was divided into eight (i) (however, i is taken as or more 1 eight or less natural number) It asks using the following relational expression [several 2] (S3).

[0016]

[Equation 2]

$$V(i) = (V_0(i+1) + V_0(i)) / 2$$

$$VW(i) = (V_0(i+1) - V_0(i)) / 2$$

[0017] Moreover, it is needed for count of [several 2] separately. V o It asks for (i) using the degree type [several 3].

[0018]

[Equation 3]

$$V_0(5) = (Tve + Tvs) / 2$$

$$V_0(1) = V_0(5) - \arctan(\tan(Tve - Tvs) / 2))$$

$$V_0(2) = V_0(5) - \arctan((3/4)\tan((Tve - Tvs) / 2))$$

$$V_0(3) = V_0(5) - \arctan((1/2)\tan((Tve - Tvs) / 2))$$

$$V_0(4) = V_0(5) - \arctan((1/4)\tan((Tve - Tvs) / 2))$$

$$V_0(6) = V_0(5) + \arctan((1/4)\tan((Tve - Tvs) / 2))$$

$$V_0(7) = V_0(5) + \arctan((1/2)\tan((Tve - Tvs) / 2))$$

$$V_0(8) = V_0(5) + \arctan((3/4)\tan((Tve - Tvs) / 2))$$

$$V_0(9) = V_0(5) + \arctan(\tan((Tve - Tvs) / 2))$$

[0019] Here V o (i) is the angle-of-visibility range of a camera 1. Tvs-Tve arctan shows the arc tangent for the i-th value divided into eight again. Next, DV calculated in the 3rd process the above [several 1] and [several 2] (k) WV (k) V (i) and VW (i) From each value, it judges whether a degree type [several 4] is materialized (S4).

[0020]

[Equation 4]

$$| V(i) - DV(k) | < VW(i) + WV(k)$$

[0021] That is, this formula judges whether each range divided into eight carries out the polymerization of the perpendicular direction angle-of-visibility range of a camera 1 to the privacy protection range about perpendicularly it saved previously, and a partial target. Then, when an upper type [several 4] is materialized (in the case [Setting to S4.] of Yes) and 1 and [several 4] are not materialized (in the case [Setting to S4.] of No), the matrix R of the eight line K train which has the element set to 0 (i, k) is created (S5 and S6), and it saves at the memory controller

5. Consequently, it means that the mask data about K perpendicular directions were made.
[0022] From the 4th process, the bearing data under actual camera revolution are processed on real time, and it goes only into the image applicable to the privacy protection range at the process which carries out masking processing of the other images. As shown in drawing 3 , namely, in a memory controller 5 The level angle-of-visibility range of a camera 1 It divides into 12 as Hvs-Hve (however, 0<Hvs <Hve). One half of values HW of horizontal central value H (i) and horizontal range width of face in each range divided into 12 (i) (however, i is taken as or more 1 12 or less natural number) The degree type [several 5] for which it asks is prepared (S7).
[0023]
[Equation 5]

$$H(i) = (H_o(i+1) + H_o(i)) / 2$$

$$HW(i) = (H_o(i+1) - H_o(i)) / 2$$

[0024] Moreover, it is needed for count of [several 5] separately. Ho (i) It asks using the degree type [several 6].
[0025]
[Equation 6]

$$H_o(7) = (Hve + Hvs) / 2$$

$$H_o(1) = H_o(7) - \arctan(\tan((Hve - Hvs) / 2))$$

$$H_o(2) = H_o(7) - \arctan((5/6)\tan((Hve - Hvs) / 2))$$

$$H_o(3) = H_o(7) - \arctan((2/3)\tan((Hve - Hvs) / 2))$$

$$H_o(4) = H_o(7) - \arctan((1/2)\tan((Hve - Hvs) / 2))$$

$$H_o(5) = H_o(7) - \arctan((1/3)\tan((Hve - Hvs) / 2))$$

$$H_o(6) = H_o(7) - \arctan((1/6)\tan((Hve - Hvs) / 2))$$

$$H_o(8) = H_o(7) + \arctan((1/6)\tan((Hve - Hvs) / 2))$$

$$H_o(9) = H_o(7) + \arctan((1/3)\tan((Hve - Hvs) / 2))$$

$$H_o(10) = H_o(7) + \arctan((1/2)\tan((Hve - Hvs) / 2))$$

$$H_o(11) = H_o(7) + \arctan((2/3)\tan((Hve - Hvs) / 2))$$

$$H_o(12) = H_o(7) + \arctan((5/6)\tan((Hve - Hvs) / 2))$$

$$H_o(13) = H_o(7) + \arctan(\tan((Hve - Hvs) / 2))$$

[0026] Here Ho (i) The level angle-of-visibility range of a camera 1 Hvs-Hve arctan shows the arc tangent for the i-th value divided into 12 again. moreover, the formula of the above [several 6] -- using -- H (i) and HW (i) of [several 5] Although it will ask In fact, since the rate of a zoom is fixed and the condition detector 3 detects only the bearing data based on [the] visual fields (that is, it becomes the value of Ho (7)) on real time, a camera 1 is H (i). Ho (7) It becomes a linear function and is HW (i). It becomes a fixed value clearly.
[0027] At the 5th process, it follows on level-turn actuation of a camera 1, and a memory controller 5 is bearing data based on camera visual fields from the condition detector 3. Ho (7) It receives serially on real time and camera horizontal visual field central value H (i) is computed by the above [several 5] (S8). Then, HW which is one half of the values of camera horizontal range width of face in a memory controller 5 (i) Said H (i) and HW (i) since it is known It is said DH (k) from 1 to 12 about i which can be set. And WH (k) k which can be set is changed from 1 to K at high speed, and a degree type [several 7] is judged (S9-S17).
[0028]
[Equation 7]

$$|H(i) - DH(k)| < HW(i) + WH(k)$$

[0029] That is, this formula judges whether each range divided into 12 carries out the polymerization of the horizontal angle-of-visibility range of a camera 1 to the privacy protection range about horizontally it saved previously, and a partial target. So, when addition writing is carried out to i train of the eight-line 12 train memory 4 (S11) and [several 7] is not materialized in k string data of Matrix R (i, k) previously saved when a top type [several 7] was materialized (in the case [Setting to S10.] of Yes) (in the case [Setting to S10.] of No), 0 is written in i train of memory 4 (S12). Consequently, the mask data about perpendicularly [K] it saved previously will be written in memory 4 according to the mask data which are obtained on real time and which are related horizontally, and the mask data to the visual field of a camera 1 are created serially.

[0030] Next, as shown in drawing 4 , about the mask data written in memory 4, data read-out from memory 4 is always performed corresponding to the level turn of a camera 1 (S18). Furthermore, by making the read-out data from memory 4 into an output signal, if an output signal becomes zero, the video signal from a camera 1 will be outputted as it is (S20), and if an output signal becomes one, the external video signal from the image output unit 6 will be outputted (S21). Here, a switch of these video signals is performed by the image change-over machine 7. In addition, after S20 and processing of S21 will return to processing of S8.

[0031] Thus, if the specific visual field range concerning privacy protection goes into the level angle-of-visibility range of a camera 1 in which it circles, the mask data which are the privacy protection information created beforehand will be serially written in memory 4 as the timing of level-turn actuation of a camera 1 is also, and this data will be further read from memory 4 serially. And according to the read data, by making 1/8 screen of the perpendicular direction of an image screen, and 1/12 horizontal screen into a smallest unit, it was outputted from the image output unit 6, and also the masked image is compounded by the image.

[0032] According to the image synthesizer unit of this example, it is horizontal visual field core data of a camera 1 in a level turn about a camera 1. Ho (i) It incorporates on real time. Only by writing 8-bit data in memory 4 using the simple judgment type shown above [several 7] The image which masked only the visual field range registered as privacy protection with the external image (for example, mosaic image) can be compounded now during camera level-turn actuation by making 1/12 of 1/8 of the field angle width of face of the perpendicular direction of an image screen, and horizontal field angle width of face into a smallest unit. And even when high-speed processing is possible for the image composition processing in this example and the swing speed of a camera 1 is enlarged, it does not affect the flattery nature of masking at all.

[0033] In addition, in this example, although the masking processing to level-turn actuation of a camera was explained, it is possible also about the masking processing in the case of making the rotation actuation of the camera carry out perpendicularly to perform same processing. Moreover, it can respond to rotation actuation of the perpendicular direction of a camera, and privacy information is similarly protected about the case where it supervises combining perpendicular rotation actuation and level rotation actuation. Furthermore, although the smallest unit of masking was explained as 1/8 of the field angle width of face of the perpendicular direction of an image screen, and 1/12 of horizontal field angle width of face, enlarging conversely is also possible still more finely [, of course it is not limited to this and].

[0034]

[Effect of the Invention] Since an image pick-up image and a predetermined image are compounded and displayed about the specific visual field field concerning privacy protection etc. when using the image synthesizer unit concerning this invention for image pick-up supervisory equipment, a privacy protection feature is fully satisfied. Moreover, a monitor image does not break off, comes to flow smoothly and becomes very legible.

[Translation done.]

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PRIOR ART

[Description of the Prior Art] In order to support the urgent activity at the time of disaster generating on disaster prevention in recent years, the activity of monitoring system which used the camera attracts attention. Here, when supervising a disaster site with a camera, the image of high resolving is usually required for a high scale factor, but in supervising especially a city area, it is also necessary to use considerable highly efficient supervisory equipment depending on the range. for example, a scale factor is level on the high performance TV camera lens of 50 times or more in "the system of a fire tower" which used the camera used at a fire department -- using the image pick-up equipment using 800-pixel CCD etc. -- very -- clear -- high -- a scale factor image can be acquired now.
[0003] However, since a living quarter will always be supervised for a high scale factor when supervising a city area using such highly efficient supervisory equipment, a problem arises in respect of privacy protection. Then, the mechanical limit function was prepared in camera rotation so that a living quarter might not project conventionally at the time of the usual monitor of those other than emergency. For example, to a living quarter angle type, the lens location of the camera which carries out a level turn is converted upward, and an image is avoided.

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EFFECT OF THE INVENTION

[Effect of the Invention] Since an image pick-up image and a predetermined image are compounded and displayed about the specific visual field field concerning privacy protection etc. when using the image synthesizer unit concerning this invention for image pick-up supervisory equipment, a privacy protection feature is fully satisfied. Moreover, a monitor image does not break off, comes to flow smoothly and becomes very legible.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, when the above image evasion approaches were taken, while it becomes the rectangle camera actuation which avoids a living quarter and privacy protection of a living quarter could be made at the time of the usual camera revolution monitor, there was a problem on the monitor that the flow of a smooth image is not acquired. That is, the monitor image acquired will cause the serious problem that the discovery cannot be performed at all, when the abnormality situation occurs in the living quarter which became what breaks off, serves as a way piece and it is very much hard to see, and carried out image evasion temporarily. [0005] This invention aims at offering the image synthesizer unit which can compound the monitor image which is made in view of this present condition, and can make privacy protection, without spoiling a monitoring function.

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MEANS

[Means for Solving the Problem] This invention is characterized by providing the following in an image synthesizer unit, in order to attain the above-mentioned purpose. The 1st storage means which memorizes the specific visual field field to picturize as a perpendicular direction and horizontal range They are a perpendicular direction and a division processing means to divide into plurality horizontally, about a field of view. The 1st judgment means which judges whether each field of view divided perpendicularly at plurality carries out a polymerization to the perpendicular direction range of said memorized specific visual field field The 2nd judgment means which judges whether each field of view horizontally divided into plurality carries out a polymerization to the horizontal range of said memorized specific visual field field to be the 2nd storage means which memorizes the judgment result of said 1st judgment means, A polymerization condition decision means to determine the polymerization condition of said specific visual field field in a field of view according to the judgment result of said 1st and 2nd judgment means, So that the contents which the 3rd storage means which memorizes the polymerization condition which said polymerization condition decision means determined, and said 3rd storage means memorized may be followed and a predetermined image may be displayed to the part which carries out a polymerization in said specific visual field field in a field of view The image display control means controlled so that the image picturized to the part which does not carry out a polymerization is displayed as it is

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OPERATION

[Function] According to the above-mentioned configuration, the specific visual field field which should be picturized is memorized as a perpendicular direction and horizontal range by the 1st storage means. Moreover, a field of view is divided and processed by plurality to a perpendicular direction and a horizontal direction with a division processing means.
[0008] Next, it is judged by the 1st judgment means whether each field of view perpendicularly divided by the division processing means and the perpendicular direction range of the specific visual field field by which division storage was carried out carry out a polymerization. Moreover, this judgment result is memorized by the 2nd storage means. Then, it is judged by the 2nd judgment means whether each field of view horizontally divided by the division processing means and the horizontal range of the specific visual field field by which division storage was carried out carry out a polymerization. Then, according to the judgment result of the 1st and 2nd judgment means, the polymerization condition of the specific visual field field in a field of view is determined by the polymerization condition decision means. Moreover, about the determined polymerization condition, it memorizes with the 3rd storage means.
[0009] Furthermore, about the part which does not carry out a polymerization, it is controlled by the image display control means so that the picturized image is displayed as it is, so that a predetermined image is displayed about the part which carries out a polymerization according to the memorized polymerization condition. Since a predetermined image was displayed to the polymerization part when a specific visual field field carries out a polymerization to a field of view the above result, as a display image, the image pick-up image and the predetermined image were compounded.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the block diagram showing the configuration of the image synthesizer unit concerning this invention.
[Drawing 2] It is the flow chart which shows processing of the image synthesizer unit shown in drawing 1 of operation.
[Drawing 3] It is a continuation of the flow chart shown in drawing 2 .
[Drawing 4] It is a continuation of the flow chart shown in drawing 3 .
[Description of Notations]
1 Camera
2 Rotation Base Equipment
3 Condition Detector
4 Memory
5 Memory Controller
6 Image Output Unit
7 Image Change-over Machine

[Translation done.]

* NOTICES *

EXAMPLE

[Example] Hereafter, one example of this invention is explained concretely, referring to a drawing. Drawing 1 is a block which shows the configuration of the image synthesizer unit concerning this invention. The rotation base equipment 2 which this image synthesizer unit supports a camera 1 and a camera 1, and is rotated, The condition detector 3 which detects bearing and the angle of visibility of a camera 1, and the memory 4 of an eight-line 12 train array, The memory controller 5 which reads the data which wrote in and wrote data in memory 4 in response to the detecting signal from the condition detector 3, It consists of image change-over machines 7 which switch the video signal from a camera 1, and the video signal from the image output unit 6 in response to the image output unit 6 which outputs the video signal from a camera 1, and the video signal which was able to take the synchronization, and the output data from memory 4.

[0011] For example, in using this image synthesizer unit at a fire department, the above-mentioned camera 1 is attached in a height as an eye of a fire tower, and with rotation base equipment 2, the level turn of it is carried out and it carries out a revolution monitor to a tilt angle and the rate immobilization of a zoom being about a surrounding situation. In performing this camera monitor, specific visual field fields, such as a living quarter, are beforehand registered into a memory controller 5 as range of the 2-way of a horizontal direction and a perpendicular direction, and it is used as data for privacy protection. And mask king processing in which the privacy protected data was followed to the image of the living quarter part which the camera 1 projected with the video signal outputted from the image output unit 6 is performed.

[0012] Drawing 2 - drawing 4 are flow charts which show processing of the image synthesizer unit shown in drawing 1 of operation. the specific visual field range concerning [as shown in drawing 2 , before performing the revolution monitor of a camera 1 as the 1st process first] privacy protection of a living quarter etc. -- as K sets of privacy protected data -- the level range (Dhs(k) -Dhe(k)) Perpendicular range (Dvs(k) -Dve(k)) ** -- it inputs into a memory controller 5 in the form to say (S1). Here, Dhs (k), Dhe (k), Dvs (k), and Dve (k) show the privacy protected data which hits the k-th of K sets of privacy protected data. That is, Dhs (k) shows the image pick-up termination include angle [in / for an image pick-up initiation include angle / in / for an image pick-up termination include angle / in / for the image pick-up initiation include angle in the horizontal direction of a camera 1 / in Dhe (k) / the horizontal direction of a camera 1 / in Dvs (k) / the perpendicular direction of a camera 1 / in Dve (k) / the perpendicular direction of a camera 1]. In addition, about the include angle, all are expressed as a solid angle from the lens side of a camera 1 in this specification.

[0013] In a memory controller 5, based on K sets of inputted privacy protected data, then, by the following four formulas [several 1] Horizontal central value of the k-th privacy protection range DH (k) and perpendicular direction central value DV (k) and one half of values of horizontal range width of face WH (k) and one half of values of perpendicular direction range width of face WV (k) (however, k is taken as the natural number below or more 1K) is calculated and saved (S2).

[0014]

[Equation 1]

$$DH(k) = (Dhs(k) + Dhe(k)) / 2$$

$$DV(k) = (Dvs(k) + Dve(k)) / 2$$

$$WH(k) = | Dhs(k) - Dhe(k) | / 2$$

$$WV(k) = | Dvs(k) - Dve(k) | / 2$$

[0015] In the 2nd process, it is the perpendicular angle-of-visibility range of a camera 1 at a memory controller 5. One half of values VW of perpendicular direction central value V (i) and perpendicular direction range width of face in each range which divided eight as Tvs-Tve (however, 0<Tvs <Tve), and was divided into eight (i) (however, i is taken as or more 1 eight or less natural number) It asks using the following relational expression [several 2] (S3).

[0016]

[Equation 2]

$$V(i) = (V_o(i+1) + V_o(i)) / 2$$

$$VW(i) = (V_o(i+1) - V_o(i)) / 2$$

[0017] Moreover, it is needed for count of [several 2] separately. V o It asks for (i) using the degree type [several 3].

[0018]

[Equation 3]

$$V_o(5) = (Tve + Tvs) / 2$$

$$V_o(1) = V_o(5) - \arctan(\tan(Tve - Tvs) / 2))$$

$$V_o(2) = V_o(5) - \arctan((3/4)\tan((Tve - Tvs) / 2))$$

$$V_o(3) = V_o(5) - \arctan((1/2)\tan((Tve - Tvs) / 2))$$

$$V_o(4) = V_o(5) - \arctan((1/4)\tan((Tve - Tvs) / 2))$$

$$V_o(6) = V_o(5) + \arctan((1/4)\tan((Tve - Tvs) / 2))$$

$$V_o(7) = V_o(5) + \arctan((1/2)\tan((Tve - Tvs) / 2))$$

$$V_o(8) = V_o(5) + \arctan((3/4)\tan((Tve - Tvs) / 2))$$

$$V_o(9) = V_o(5) + \arctan(\tan((Tve - Tvs) / 2))$$

[0019] Here V o (i) is the angle-of-visibility range of a camera 1. Tvs-Tve arctan shows the arc tangent for the i-th value divided into eight again. Next, DV calculated in the 3rd process the above [several 1] and [several 2] (k) WV (k) V (i) and VW (i) From each value, it judges whether a degree type [several 4] is materialized (S4).

[0020]

[Equation 4]

$$| V(i) - DV(k) | < VW(i) + WV(k)$$

[0021] That is, this formula judges whether each range divided into eight carries out the polymerization of the perpendicular direction angle-of-visibility range of a camera 1 to the privacy protection range about perpendicularly it saved previously, and a partial target. Then, when an upper type [several 4] is materialized (in the case [Setting to S4.] of Yes) and 1 and [several 4] are not materialized (in the case [Setting to S4.] of No), the matrix R of the eight line K train which has the element set to 0 (i, k) is created (S5 and S6), and it saves at the memory controller 5. Consequently, it means that the mask data about K perpendicular directions were made.

[0022] From the 4th process, the bearing data under actual camera revolution are processed on real time, and it goes only into the image applicable to the privacy protection range at the process which carries out masking processing of the other images. As shown in drawing 3 , namely, in a memory controller 5 The level angle-of-visibility range of a camera 1 It divides into 12 as Hvs-Hve (however, 0<Hvs <Hve). One half of values HW of horizontal central value H (i) and horizontal range width of face in each range divided into 12 (i) (however, i is taken as or more 1 12 or less natural number) The degree type [several 5] for which it asks is prepared (S7).

[0023]

[Equation 5]

$$H(i) = (H_o(i+1) + H_o(i)) / 2$$

$$HW(i) = (H_o(i+1) - H_o(i)) / 2$$

[0024] Moreover, it is needed for count of [several 5] separately. Ho (i) It asks using the degree type [several 6].
[0025]
[Equation 6]

$$H_o(7) = (Hve + Hvs) / 2$$

$$H_o(1) = H_o(7) - \arctan(\tan((Hve - Hvs) / 2))$$

$$H_o(2) = H_o(7) - \arctan((5/6)\tan((Hve - Hvs) / 2))$$

$$H_o(3) = H_o(7) - \arctan((2/3)\tan((Hve - Hvs) / 2))$$

$$H_o(4) = H_o(7) - \arctan((1/2)\tan((Hve - Hvs) / 2))$$

$$H_o(5) = H_o(7) - \arctan((1/3)\tan((Hve - Hvs) / 2))$$

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[0026] Here Ho (i) The level angle-of-visibility range of a camera 1 Hvs-Hve arctan shows the arc tangent for the i-th value divided into 12 again. moreover, the formula of the above [several 6] -- using -- H (i) and HW (i) of [several 5] Although it will ask In fact, since the rate of a zoom is fixed and the condition detector 3 detects only the bearing data based on [the] visual fields (that is, it becomes the value of Ho (7)) on real time, a camera 1 is H (i). Ho (7) It becomes a linear function and is HW (i). It becomes a fixed value clearly.
[0027] At the 5th process, it follows on level-turn actuation of a camera 1, and a memory controller 5 is bearing data based on camera visual fields from the condition detector 3. Ho (7) It receives serially on real time and camera horizontal visual field central value H (i) is computed by the above [several 5] (S8). Then, HW which is one half of the values of camera horizontal range width of face in a memory controller 5 (i) Said H (i) and HW (i) since it is known It is said DH (k) from 1 to 12 about i which can be set. And WH (k) k which can be set is changed from 1 to K at high speed, and a degree type [several 7] is judged (S9-S17).
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[Equation 7]

$$|H(i) - DH(k)| < HW(i) + WH(k)$$

[0029] That is, this formula judges whether each range divided into 12 carries out the polymerization of the horizontal angle-of-visibility range of a camera 1 to the privacy protection range about horizontally it saved previously, and a partial target. So, when addition writing is carried out to i train of the eight-line 12 train memory 4 (S11) and [several 7] is not materialized in k string data of Matrix R (i, k) previously saved when a top type [several 7] was materialized (in the case [Setting to S10.] of Yes) (in the case [Setting to S10.] of No), 0 is written in i train of memory 4 (S12). Consequently, the mask data about perpendicularly [K] it saved previously will be written in memory 4 according to the mask data which are obtained on real time and which are related horizontally, and the mask data to the visual field of a camera 1 are created serially.
[0030] Next, as shown in drawing 4 , about the mask data written in memory 4, data read-out from memory 4 is

always performed corresponding to the level turn of a camera 1 (S18). Furthermore, by making the read-out data from memory 4 into an output signal, if an output signal becomes zero, the video signal from a camera 1 will be outputted as it is (S20), and if an output signal becomes one, the external video signal from the image output unit 6 will be outputted (S21). Here, a switch of these video signals is performed by the image change-over machine 7. In addition, after S20 and processing of S21 will return to processing of S8.

[0031] Thus, if the specific visual field range concerning privacy protection goes into the level angle-of-visibility range of a camera 1 in which it circles, the mask data which are the privacy protection information created beforehand will be serially written in memory 4 as the timing of level-turn actuation of a camera 1 is also, and this data will be further read from memory 4 serially. And according to the read data, by making 1/8 screen of the perpendicular direction of an image screen, and 1/12 horizontal screen into a smallest unit, it was outputted from the image output unit 6, and also the masked image is compounded by the image.

[0032] According to the image synthesizer unit of this example, it is horizontal visual field core data of a camera 1 in a level turn about a camera 1. Ho (i) It incorporates on real time. Only by writing 8-bit data in memory 4 using the simple judgment type shown above [several 7] The image which masked only the visual field range registered as privacy protection with the external image (for example, mosaic image) can be compounded now during camera level-turn actuation by making 1/12 of 1/8 of the field angle width of face of the perpendicular direction of an image screen, and horizontal field angle width of face into a smallest unit. And even when high-speed processing is possible for the image composition processing in this example and the swing speed of a camera 1 is enlarged, it does not affect the flattery nature of masking at all.

[0033] In addition, in this example, although the masking processing to level-turn actuation of a camera was explained, it is possible also about the masking processing in the case of making the rotation actuation of the camera carry out perpendicularly to perform same processing. Moreover, it can respond to rotation actuation of the perpendicular direction of a camera, and privacy information is similarly protected about the case where it supervises combining perpendicular rotation actuation and level rotation actuation. Furthermore, although the smallest unit of masking was explained as 1/8 of the field angle width of face of the perpendicular direction of an image screen, and 1/12 of horizontal field angle width of face, enlarging conversely is also possible still more finely [, of course it is not limited to this and].

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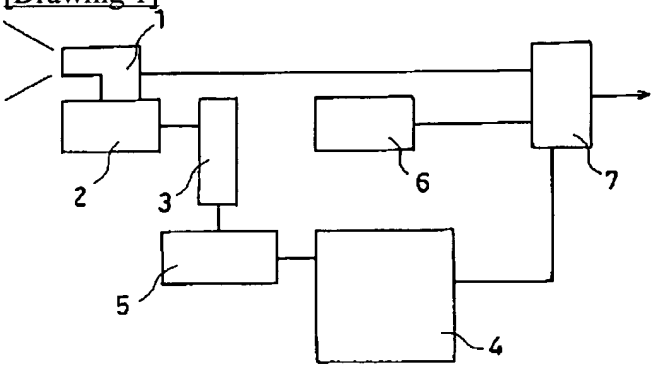
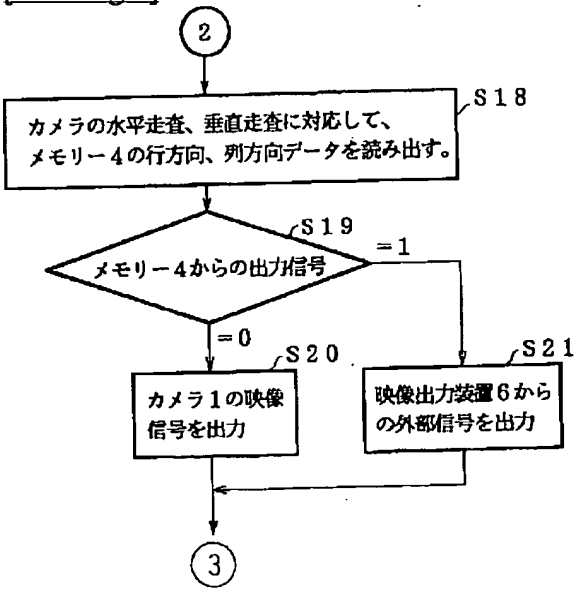
DRAWINGS

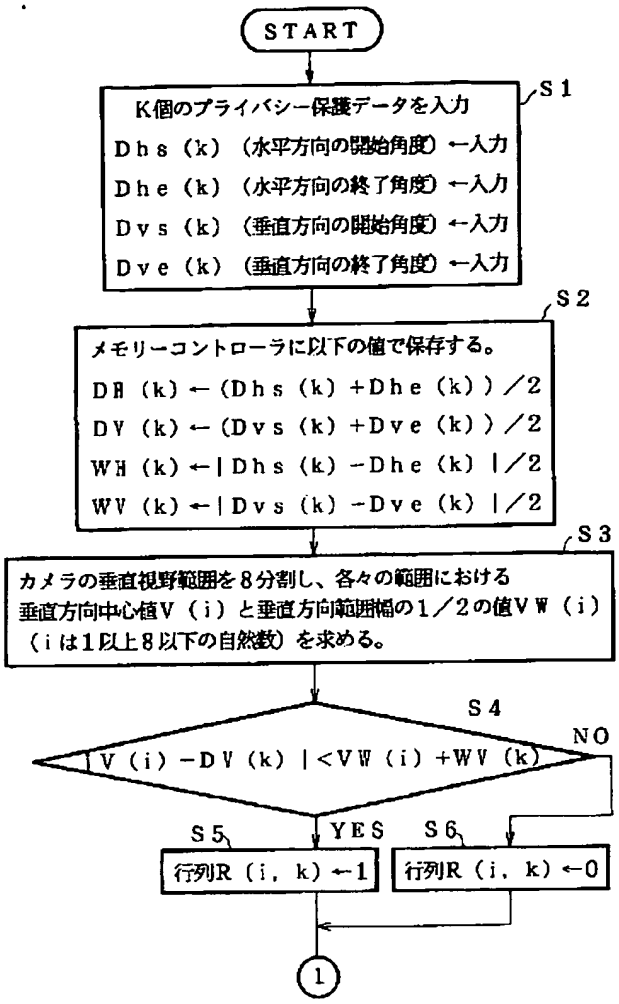
[Drawing 1]



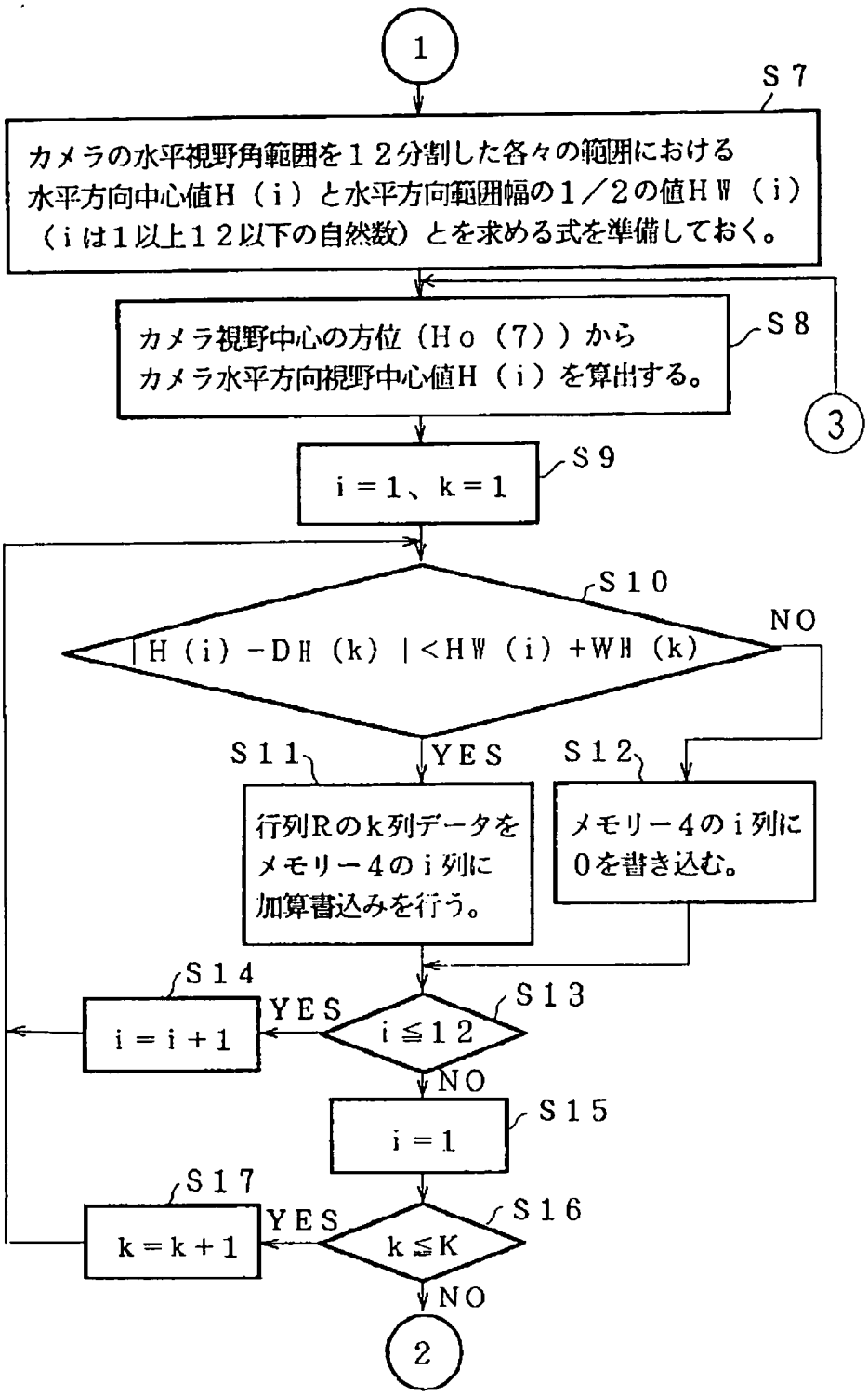
[Drawing 4]



[Drawing 2]


START
S1
K個のプライバシー保護データを入力
Dhs (k) (水平方向の開始角度) ←入力
Dhe (k) (水平方向の終了角度) ←入力
Dvs (k) (垂直方向の開始角度) ←入力
Dve (k) (垂直方向の終了角度) ←入力
S2
メモリーコントローラに以下の値で保存する。
DH (k) ← (Dhs (k) +Dhe (k)) /2
DV (k) ← (Dvs (k) +Dve (k)) /2
WH (k) ← | Dhs (k) -Dhe (k) | /2
WV (k) ← | Dvs (k) -Dve (k) | /2
S3
カメラの垂直視野範囲を8分割し、各々の範囲における
垂直方向中心値V (i) と垂直方向範囲幅の1/2の値VW (i)
(iは1以上8以下の自然数) を求める。
S4
| V (i) -DV (k) | <VW (i) +WV (k)
NO
YES
S5
行列R (i, k) ←1
S6
行列R (i, k) ←0
1

[Drawing 3]



[Translation done.]